Nov. 19, 1968 A. GLASSMAN 3,411,749

LIFTING DEVICE SUPPORTED AT BOTH ENDS AND SCREW ACTUATED

Filed Oct. 13, 1965 2 Sheets-Sheet 1

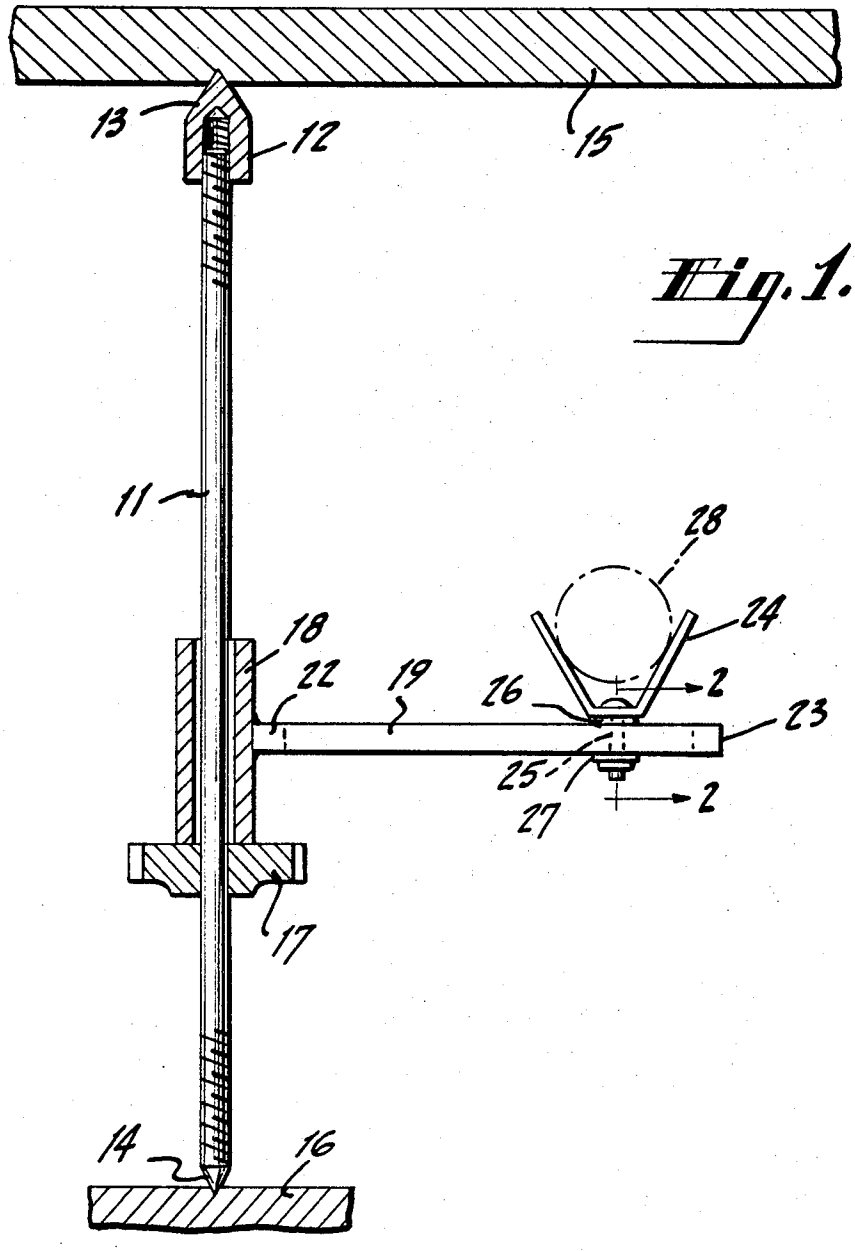


Fig. 1.

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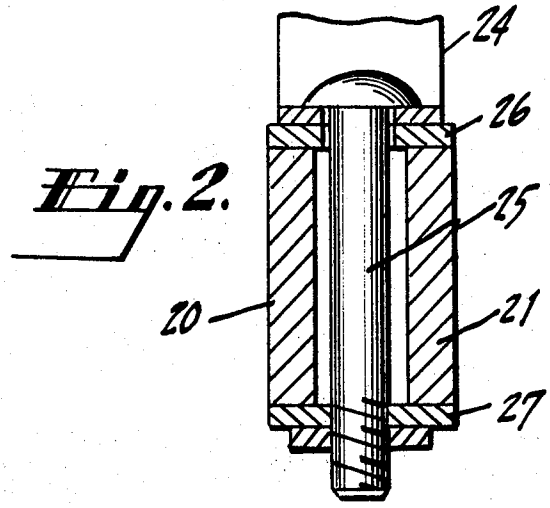


Fig. 2.

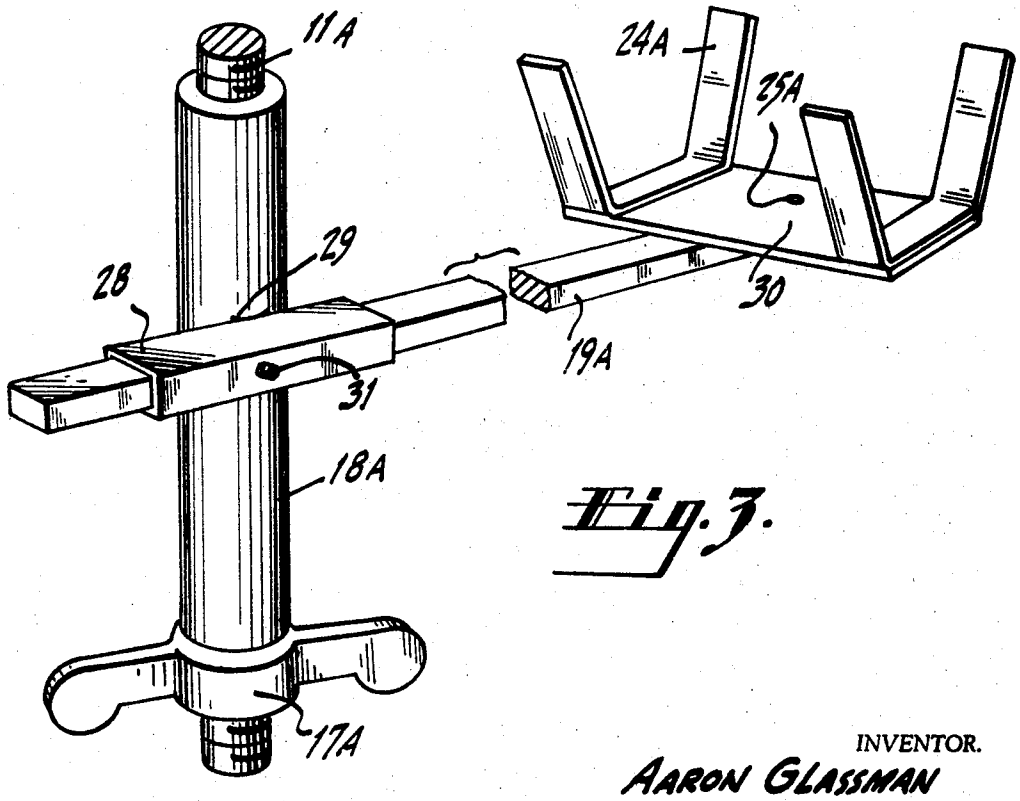


Fig. 3.

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LIFTING DEVICE SUPPORTED AT BOTH ENDS AND SCREW ACTIVATED

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4 Claims. (Cl. 254—100)

ABSTRACT OF THE DISCLOSURE

A lifting device comprised of an externally-threaded standard, adjustable in length, for spanning the underside of a table top and the floor below, and including anchor means at both ends to engage said underside and said floor and to maintain the standard in a substantially upright position. The device includes a sleeve slidably mounted and rotatable on the standard, a workholder mounted on the sleeve and shiftable radially from the standard, and internally-threaded means threaded on the standard for raising and lowering the sleeve.

This invention relates to a novel lifting device. This device is particularly usable for removing and/or installing a motor on its mounting under a sewing machine.

It is frequently necessary to remove a defective motor from its mounting under a sewing machine table and to install a usable motor in its place. Because of the awkward position of the motor in addition to its weight, it is difficult for one man to do this. Nevertheless, many factories have only one man available for this purpose.

An object of this invention is to provide a novel lifting device.

A further object is to provide a lifting device for removing and/or installing a motor in its mounting under a work table.

Another object is to provide a lifting device with which one man can quickly and easily remove and/or install a motor in its mounting under a sewing machine table.

The novel lifting device, which is adapted to be used between the underside of a table top and the floor below, comprises

(a) An externally threaded standard for spanning said underside and said floor,

(b) A sleeve slidably mounted on said standard and rotatable thereon,

(c) A work holder mounted on said sleeve,

(d) And an internally-threaded elevation adjustment means threaded on the standard for raising and lowering the sleeve.

To operate the novel device the standard is mounted in a substantially vertical position by engaging the table underside and the floor below. To this end, it is desirable and it is a further feature of a preferred form of the device, that the standard be adjustable in length, in which case, the standard may be positioned and then lengthened so that the ends of the standard engage the table underside and the floor. It is also desirable, and it is another feature of a preferred form of the device, that the standard have anchor means, such as conical points, at both ends thereof to prevent lateral movement of the standard, particularly when there is a heavy object in the work holder.

To remove a motor from its mounting, the elevation adjustment means is rotated to lower the sleeve and the work holder, which are then rotated about the standard until the work holder is below the motor to be removed. It is a feature of the preferred form of the device that the sleeve have a horizontally-extending arm, so designed that

the work holder may be positioned along the length of the arm.

The elevation adjustment means is now rotated to raise the sleeve and the work holder until the work holder lifts the motor clear of its mounting. The sleeve and work holder are now rotated about the standard to a position out from under the table. The motor may now be lifted off the work holder by hand or may be lowered into another work holder by rotating the elevation adjustment means. To install a motor, the same steps are performed in reverse order after the standard has been positioned.

A further description of the device including a preferred embodiment thereof will now be given with reference to the drawing in which:

FIGURE 1 is a sectional elevational view of a first form of the device,

FIGURE 2 is a fragmentary sectional view along section lines 2—2 of FIGURE 1, and

FIGURE 3 is a fragmentary perspective view of a second form of the device.

A first form of the device illustrated in FIGURES 1 and 2 comprises a standard including an externally-threaded shaft **11**. The standard includes an internally-threaded length adjustment member **12** that is threaded on the upper end of the shaft **11**. The standard **11** may be adjusted in length by rotating the member **12** with respect to the shaft **11**. The standard has conical points **13** and **14** at both ends thereof. The points **13** and **14** are adapted to engage the underside of a table top **15** and the floor **16** below the top **15** and to anchor the standard in a substantially upright position.

An internally-threaded elevation adjustment means **17** is threaded on the shaft **11**. The elevation adjustment means is intended to be rotated manually so that its position on the shaft **11** may be changed. As illustrated in FIGURE 1, the elevation adjustment means **17** is a spur gear which has been internally threaded. As illustrated in FIGURE 3, the elevation adjustment means is a large winged nut.

A sleeve **18** is slidably mounted on the shaft **11** and rests upon the elevation adjustment means **18**. The sleeve is somewhat smaller than the elevation adjustment means **17**. Since the sleeve **18** is slidably mounted, it is rotatable about the shaft **11**. An arm **19** is welded to the sleeve **18** and extends outward horizontally. The arm **19** shown in detail in FIGURE 2 is comprised of a pair of metal straps **20** and **21** spaced by spacers **22** and **23**. A work holder **24** is mounted on the arm **19** with a bolt **25** extending through the slot between the straps **20** and **21** and a pair of washers **26** and **27**. The work holder **24** may be positioned along the arm **19** by loosening the bolt **25**, sliding the work holder **24** to the desired position and then tightening the bolt **25**. Also, the work holder **24** may be rotated about the bolt **25**.

To operate the first form of the device to unload a motor, the standard is held in an upright position and the lengthening means **12** is rotated with respect to the shaft **11** until the points **13** and **14** anchor in the underside of a table top **15** and the floor **16** below. The bolt **25** is loosened and the elevation adjustment means **17** is rotated until the work holder **24** is below the motor to be unloaded. The arm **19** is rotated about the shaft **11** until it is under the motor. Then the work holder **24** is slid along the arm **19** and rotated about the bolt **25** until it is in a position to receive the motor. Then, the elevation adjustment means **17** is rotated to raise the work holder **24** until it lifts the motor off of its mounting. The motor is indicated by the dotted circle **28**.

To operate the device to install a motor, the standard is anchored in an upright position as described above.

Then the work holder **24** is placed in approximately the desired position on the arm **19** which is in a position above the motor mounting. The work holder **24** is rotated out from under the table. Then a motor is placed in the work holder **24**. The work holder **24** is rotated back under the table top **15** and raised by rotating the elevation adjustment means **17** until the motor is in its mounting. After the motor has been mounted, the work holder **24** is lowered and then swung out from under the table top **15**.

A fragmentary view of a second form of the device illustrated in FIGURE 3 comprises a standard **11***a* including a length adjustment member (not shown) and having conical points (not shown) at both ends thereof similar to those illustrated in FIGURE 1. The second form also includes an elevation adjustment means **17***a* and a round sleeve **18***a* similar to those illustrated in FIGURE 1. The second form has a square sleeve **28** held to the round sleeve **18***a* by a weld **29**. An arm **19***a* of square cross-section fits loosely through the square sleeve **28**. A work holder **24***a* is held to one end of the arm **19***a* with a fastener **25***a* which passes through an asymmetrically-located hole in the base plate **30** of the work holder **24***a* and a hole near the one end of the arm **19***a*.

It has been found desirable to provide a set screw **31** in a wall of the square sleeve **28** so that, if desired, the arm **19***a* may be temporarily fixed in position in the square sleeve **28**. It has also been found desirable to tilt the square sleeve **28** so that the work holder end of the arm **19***a* is somewhat higher than the other end of the arm **19***a* during operation of the device.

The operation of the second form of the device is similar to that of the first form except the work holder **24***a* may be positioned as desired simply by sliding the arm **19***a* in the square sleeve **28**, rotating the work holder **24***a* about the bolt **25***a*, and rotating the round sleeve **18***a* about the standard **11***a*.

The novel lifting device may be varied in specific detail without departing from the essence of the invention. Thus, the standard may vary in design. A circular shaft about 28 inches long and about 1.0 inch in diameter is preferred. The standard is preferably externally threaded with National coarse threads. Similarly, the anchor means **13** and **14**, the elevation adjustment means **17**, the sleeve **18**, the arm **19**, and the work holder **24** may be modified in design.

The novel lifting device may be used in other ways than that described. For example, items other than motors may be handled and the tables may be for sewing or for other operations. Also, for example, when anchoring the standard in the upright position, the lower end of the standard may be anchored in a cross brace for the table legs and not in the floor. Such a mounting has the advantage that the standard remains upright should the table slide on the floor or be lifted.

What is claimed is:

1. A lifting device adapted to be used between the underside of a table top and the floor below said table top comprising:

(a) an externally-threaded standard for spanning said underside and said floor, said standard being adjustable in length,

(b) a sleeve slidably mounted on said standard and rotatable thereon,

(c) a work holder mounted on said sleeve and shiftable radially from said standard,

(d) an internally-threaded means threaded on said standard for raising and lowering said sleeve, and

(e) anchor means at both ends of said standard adapted to engage said underside and said floor and to maintain said standard in a substantially upright position.

2. A portable lifting device adapted to be used between the underside of a table top and the floor below said table top comprising:

(a) an externally-threaded standard for spanning said underside and said floor, said standard including an internally-threaded member threaded on one end of said standard and adapted to adjust the length of said standard by the rotation of one with respect to the other,

(b) a sleeve slidably mounted on said standard and rotatable thereon, said sleeve having a horizontally-extending arm,

(c) a work holder mounted on said arm and shiftable radially from said standard,

(d) an internally-threaded means threaded on said standard for raising and lowering said sleeve, and

(e) anchor means at both ends of said standard adapted to engage said underside and said floor and to maintain said standard in a substantially upright position.

3. The device described in claim **2** wherein the means for mounting said work holder on said sleeve comprises another sleeve of square cross-section fixedly attached to said first-mentioned sleeve, a horizontally-extending arm slidably mounted through said other sleeve, and a fastener engaging said work holder and one end of said arm, said work holder being rotatable about said fastener.

4. A portable lifting device adapted to be used between the underside of a table top and the floor below said table top comprising:

(a) an externally-threaded standard for spanning said underside and said floor, said standard including an internally-threaded member threaded on one end of said standard and adapted to adjust the length of said standard by the rotation of one with respect to the other,

(b) a sleeve slidably mounted on said standard and rotatable thereon, said sleeve having a horizontally-extending arm, said arm having a vertical slot extending radially from said sleeve,

(c) a work holder mounted on said arm including a fastener engaging said work holder and extending through said slot, said work holder being shiftable radially from said standard along the radial dimension of said slot,

(d) an internally-threaded means threaded on said standard adapted to receive thereon the weight of said sleeve and to raise and lower said sleeve by the rotation of said means with respect to said standard, and

(e) a conical point at both ends of said standard adapted to engage said underside and said floor and to anchor said standard in a substantially upright position.

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